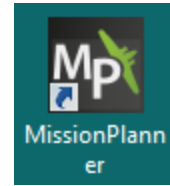# FWS / NPS GIS Workshop
Mar. 1-2, 2016
NCTC, Shepherdstown, WV

UAS Mission Planning

Visualizing and Creating Transects in Mission Planner

What is Mission Planner?

The Control Panel to the ArduPilot eco system.

http://ardupilot.com/

http://dev.ardupilot.com/ - "Why the name?" paragraph on this page. Ardu comes from the original Arduino based project.

Tips for Navigating in Mission Planner

- Right Click then Left Click on map to reset
- Left Click Hold to Pan
- Scroll Wheel or Zoom slider on right
- Start Over Often
- Right Click => Clear Mission
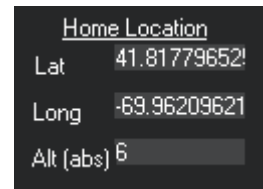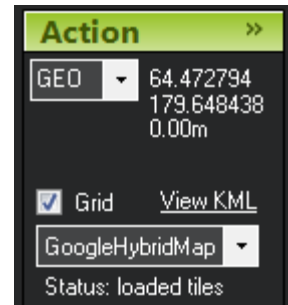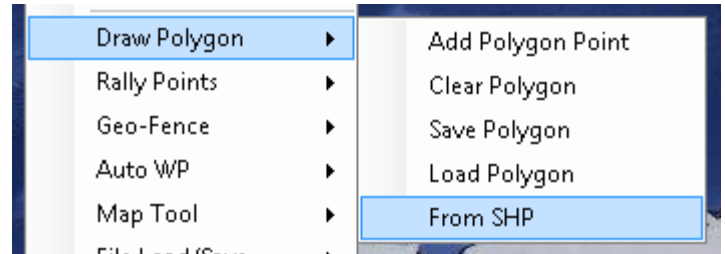- Right Click => Draw Polygon => Clear Polygon

Units Converter = Google Search => convert mph

http://planner.ardupilot.com/wiki/common-pixhawk-overview/

Mission Planner Lab

1. Open MissionPlanner with Desktop Icon
2. During mission, switching between Flight Data and Flight Plan screens
   a. Right Click in Flight Data window and select Flight Planner
3. Load AOI Shape File
   a. Right Click Map
   b. Draw Polygon => From SHP
   c. Select Cape Code Shape file.
   d. This zooms us to the area
4. Various base layers available.
   a. GoogleHybridMap
   b. BingHybridMap
5. Need to cache tiles before heading to the field where there is no Internet Access
   a. Zoom in and out
   b. Pan around
6. Turn on Grid
   a. Changes scale with zoom level
7. Measuring
   a. Right click on one end of your measurement
      i. Select Map Tool => Measure Distance
      ii. Uncheck message if you want
   b. Right click other end of measurement point
      i. Select Map Tool => Measure Distance
8. Zoom / Pan to Parking Lot at end of Fort Hill Rd
   a. The center west half of our AOI is a wetland area
   b. Zoom into the west center area of our polygon
   c. Locate the parking lot in large open space(green or brown)
9. Set Home Altitude and Location
   a. Notice pointer coordinates and altitude in upper right
   b. Move cursor into open space south of parking lot.
   c. Notice altitude reading
   d. Enter that reading in Alt field under Home Location.
   e. Left Click in Lat field under Home Location
   f. "Click on the Map to set Home"
   g. We now have Home Location point.
10. WP Radius to help our perspective
    a. Change to 100 meters
    b. We can see the grid is a 100 meter grid.

11. Zoom out until WP Radius disappears and Grid snaps to 1,000 meters / 1Km
12. We are going to draw a new polygon for our first mapping area
    a. Clear out our AOI polygon
        i. Right click anywhere in map
        ii. Draw Polygon => Clear Polygon
    b. We can cover 1.5-2 sq/km in a one hour flight.
    c. Right click for first point
        i. Draw Polygon => Add Polygon Point
    d. Left click remaining three points
13. Auto Way Point Generation
    a. Right click anywhere on map
    b. Auto WP => Survey (Grid)
    c. The Survey (Grid) Window appears with auto generated points
    d. Go to Full Screen
    e. Select Camera Nex7 16mm
    f. Review Stats at bottom
        i. Notice Ground Resolution
        ii. Notice Flight Time
    g. Set Flying Speed to 27 knots
        i. Use Google search to convert 27 knots to meters/second
        ii. Notice Flight Time changed
    h. Check Advanced Options
    i. Check Camera Options Tab
        i. Set Focal Length to 20mm
        ii. Notice Track spacing changes with focal length
    j. Check Grid Options Tab
        i. Overlap %
        ii. Sidelap %
        iii. Add 250 meters to both OverShoots
        iv. Add 100 meters to LeadIn
    k. Wind – we want to fly into the wind
        i. On Simple Tab, change Angle to 90
14. Click Accept button at bottom of Simple Tab
    a. Notice Waypoints at bottom of window
    b. Can adjust as needed
    c. Add perpendicular passes
    d. Write WPs send these to aircraft